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Pamphlet 40-21

Medical Services

Ergonomics Program

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SUMMARY of CHANGE

DA PAM 40-21
Ergonomics Program

This new Department of the Army pamphlet--

- o Outlines the goals of an installation Ergonomics Program and addresses organizational involvement in preventing illnesses and injuries by eliminating or reducing occupational risk factors (chap 1).
- o Discusses development of an ergonomics plan that focuses on the identification and control of improper workplace and work process design (chap 2).
- o Describes in detail the primary Ergonomics Program functions of worksite analysis (chap 3), hazard prevention and control (chap 4), health care management (chap 5), education and training (chap 6), and Ergonomics Program evaluation (chap 7).

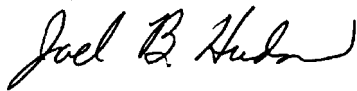
Medical Services

Ergonomics Program

By Order of the Secretary of the Army:

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History. This publication publishes a new Department of the Army pamphlet.

Summary. This pamphlet provides guidance for establishing the Ergonomics Program component as an integral part of the

Occupational Safety and Health Program and Preventive Medicine Program at all facilities controlled by the Department of the Army.

Applicability. This pamphlet applies to the Active Army, the Army National Guard (ARNG), the U.S. Army Reserve (USAR), and civilian personnel and non-appropriated fund personnel employed by the Army worldwide.

Proponent and exception authority. The proponent of this pamphlet is The Surgeon General. The Surgeon General has the authority to approve exceptions to this pamphlet that are consistent with controlling law and regulation. The Surgeon General may delegate the approval authority, in writing, to a division chief within the proponent agency who holds the grade of colonel or the civilian equivalent.

Suggested Improvements. Users are

invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Headquarters, Department of the Army (HQDA) (DASG-HS), 5109 Leesburg Pike, Falls Church, VA 22041-3258.

Committee Establishment Approval The DA Committee Management Officer concurs in the establishment of the Ergonomics Subcommittee.

Distribution. This publication is available in electronic format only (EMO), and is intended for command levels C, D, and E for the Active Army, the Army National Guard, and the U.S. Army Reserve.

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Chapter 1

Introduction

1-1. Purpose

This pamphlet provides guidance for establishing the Ergonomics Program component as an integral part of the Occupational Safety and Health Program and Preventive Medicine (PVNTMED) Program at all facilities controlled by the Department of the Army (DA) as required in AR 385-10, paragraph 1-4g; AR 40-5, paragraphs 1-4b and 5-3; and Headquarters, Department of the Army Letter (HQDA LTR) 40-00-1.

1-2. References

Required and related publications and prescribed and referenced forms are listed in appendix A.

1-3. Explanation of abbreviations and terms

Abbreviations and special terms used in this pamphlet are explained in the glossary.

1-4. Background

- a.* An effective Ergonomics Program can—
 - (1) Prevent workplace injuries.
 - (2) Reduce medical and associated costs of work-related musculoskeletal disorders (WMSDs) (see glossary).
 - (3) Preserve the fighting strength of the armed forces.
- b.* Ergonomics programs fall under—
 - (1) The Occupational Safety and Health Act of 1970 (Public Law (PL) 91-596); Executive Order (EO) 12196, section 1-201; and title 29, Code of Federal Regulations (CFR), Part 1960.8(a).
 - (2) Department of Defense (DOD) Instruction (DODI) 6055.1, DOD Safety and Occupational Health (SOH) Program.
 - (3) HQDA LTR 40-00-1, DASG, 14 July 2000, subject: Army Ergonomics Program.

1-5. Program areas

This pamphlet applies to installation-level worksite analysis, hazard prevention and control, health care management, education and training, and Ergonomics Program evaluation at all table of distribution and allowances and tables of organization and equipment organizations. Other commands within the Army use ergonomics principles in the process of developing and refining Army systems, specifically in Army-wide initial equipment design, assessment, and related human performance research.

1-6. Goals

- a.* The goals of the Ergonomics Program are to—
 - (1) Prevent injuries and illness by eliminating or reducing worker exposure to WMSD risk factors.
 - (2) Reduce the potential for fatigue, error, and unsafe acts by adapting the job and workplace to the worker's capabilities and limitations.
 - (3) Increase the overall productivity of the work force.
 - (4) Reduce workers' compensation claims and associated costs.
 - (5) Improve overall unit readiness.
- b.* An emphasis on early identification and prevention of WMSDs will preserve and protect our military and civilian work force while decreasing related costs.

1-7. Organizational involvement

A collaborative partnership among all levels of the working community is essential in achieving the goals of the Ergonomics Program. Command emphasis, commitment by management, and demonstrated visible involvement are imperative to provide the organizational resources and motivation needed to implement a sound ergonomics policy. All levels of DA personnel (manager, supervisor, worker, and soldier) are responsible for injury prevention and the identification and resolution of WMSDs.

1-8. Effects of work-related musculoskeletal disorders

- a. Health effects.* Repeated biomechanical stress and microtrauma cause or aggravate WMSDs. Over time, repeated microtrauma can evolve into a painful, debilitating state involving muscles, tendons, tendon sheaths, and nerves. Examples of WMSDs are—
 - (1) Tendinitis.
 - (2) Tenosynovitis.
 - (3) Bursitis.
 - (4) Chronic muscle strain.
 - (5) Nerve entrapment syndromes (for example, carpal tunnel syndrome).

b. Economic effects. The expense associated with a poorly designed workplace is considerable and includes both direct and indirect costs.

(1) Direct costs include medical treatment, rehabilitation, and workers' compensation costs.

(2) Indirect costs include lost work time, decreased productivity, decreased work quality, retraining costs, and diminished morale.

1–9. Occupational risk factors

a. Research identifies the following as specific workplace conditions that can contribute to the development of WMSDs:

(1) Repetitive motions (especially during prolonged activities).

(2) Sustained or awkward postures.

(3) Excessive bending or twisting of the wrist.

(4) Continued elbow or shoulder elevation (for example, overhead work).

(5) Forceful exertions (especially in an awkward posture).

(6) Excessive use of small muscle groups (for example, pinch grip).

(7) Acceleration and velocity of dynamic motions.

(8) Vibration.

(9) Mechanical compression.

(10) Restrictive workstations (for example, inadequate clearances).

(11) Improper seating or support.

(12) Inappropriate hand tools.

(13) Machine–pacing and production–based incentives.

(14) Extreme temperatures.

(15) Extended exposure to hazardous or annoying noise.

b. The combined effect of several risk factors in one job or workstation may lead to a higher probability of causing a WMSD.

1–10. Technical assistance

Technical assistance may be requested through command channels to Commander, U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), ATTN: MCHB–TS–OER, Aberdeen Proving Ground, MD 21010–5403.

Chapter 2

The Installation Ergonomics Plan

2–1. Focus

The installation ergonomics plan focuses on the identification and control of improper workplace and work process design to protect personnel from injury and illness due to exposure to occupational risk factors, as defined in paragraph 1–9.

2–2. Practical effects

Implementing an installation ergonomics plan will help reduce the number of WMSDs and related medical compensation claims, resulting in improved product quality, productivity, and personnel morale as well as decreased costs.

2–3. Development and approval

a. The Installation Ergonomics Officer (IEO) and the Ergonomics Subcommittee develop, document, and maintain the installation ergonomics plan. They may–

(1) Solicit input to the plan from health care providers, including physicians, nurses, occupational therapists, physical therapists, and physician assistants.

(2) Integrate the plan with the installation or activity health promotion and wellness program coordinator as appropriate.

(3) Request technical assistance on plan development from USACHPPM (para 1–10).

b. The installation Safety and Occupational Health Advisory Council (SOHAC) recommends the installation ergonomics plan to the commander for approval and communicates the plan to all managers, supervisors, and workplace personnel.

2-4. Outline

a. The installation ergonomics plan should reflect the needs and requirements of the individual installation. *The IEO and the Ergonomics Subcommittee may use the structure and content provided in this pamphlet in developing an installation ergonomics plan that addresses each of the elements.* At a minimum, the ergonomics plan should contain the elements listed below.

- (1) Program goals and objectives.
- (2) Program interface with existing programs.
- (3) Specific critical program elements for ergonomic intervention—
 - (a) Worksite analysis (chap 3).
 - (b) Hazard prevention and control (chap 4).
 - (c) Health care management (chap 5).
 - (d) Education and training (chap 6).
 - (e) Ergonomics Program evaluation (chap 7).

b. The extent of involvement in each of the five critical program elements in paragraph 2-4a(3) will vary according to the hazards and concerns at each installation; however, some degree of activity in each of the five critical program elements is required for an effective program.

Chapter 3 Worksite Analysis

3-1. Problem identification

Use the following procedures of systematic passive and active surveillance to identify jobs or worksites with WMSD risk factors.

a. *Systematic passive surveillance.* This procedure involves the analysis of data provided in existing monthly or quarterly reports. This analysis can identify WMSD problems, set intervention priorities, and organize the ergonomics effort. The office responsible for maintaining the records, logs, or reports should perform the systematic passive surveillance and communicate the results to the IEO and the Ergonomics Subcommittee. Sources of data include—

- (1) Routine injury and illness reports, including DA Form 3076 (Army Occupational Health Report).
- (2) Log of Federal Occupational Injuries and Illnesses or equivalent.
- (3) Federal Employee Compensation Act (FECA) claims.
- (4) DA Form 285 (U.S. Army Accident Report) and DA Form 285-AB-R (U.S. Army Abbreviated Ground Accident Report (AGAR)).
- (5) Medical and safety records.
- (6) Work force reports (including civilian and active-duty personnel and pay reports of lost duty time as a result of injury or illness) and suggestions.

b. *Systematic active surveillance.* This procedure involves focused and active efforts to gather information about WMSD hazards at worksites and to identify workers at risk of developing a WMSD. Trained ergonomics personnel (see glossary) should perform active surveillance in conjunction with industrial hygiene (IH) or safety surveys or regular training.

- (1) Examples of active surveillance procedures include—

(a) *Questionnaires and surveys.* Supervisor and worker questionnaires and symptom or body part discomfort surveys provide information about WMSD hazards, often before actual injuries occur (USACHPPM Technical Guide (TG) 220). Trained ergonomics personnel can administer these surveys during walk-through surveys or as part of regular training.

(b) *Observation.* Direct observation by trained ergonomics personnel conducting regular walk-through IH or safety surveys can identify WMSD hazards (USACHPPM TG 220). Worker interviews during these surveys can identify tasks or situations that are uncomfortable and may indicate WMSD risk factors. For example, workers note that cold temperatures make it difficult to grip hand tools.

(c) *Sentinel event or incident reporting.* Specific health or performance events, such as wrist pain, back pain, or increased errors, may be indicative of WMSD risk factors. Use a specific reporting procedure to facilitate reports.

(d) *Case referrals.* Use case referrals to identify a work area with potential WMSD risk factors. For example, a laboratory technician seeks medical care for hand and wrist pain and provides an occupational history that indicates possible worksite risk factors.

(2) The presence of one WMSD should trigger an active surveillance survey using appropriate questionnaires or surveys (USACHPPM TG 220). Trained ergonomics personnel should perform systematic active surveillance at all worksites at least once per year. Also, trained ergonomics personnel should perform walk-through surveys for any new or significantly changed job, process, equipment, or method.

(3) In many cases, corrections to the WMSD hazards or risk factors are simple, quick, on-the-spot workplace changes. Trained ergonomics personnel conducting regular walk-through surveys can identify and implement the solution immediately. Chapter 4 provides information on hazard prevention and control. More complex problems will require prioritization and detailed analysis.

(4) If a worksite or job is identified as high risk, special medical surveillance may be indicated. See chapter 5 for information on health care management.

3-2. Prioritization

The Ergonomics Subcommittee or the appropriate subcommittee member (for example, IH, safety, health care, etc.) should prioritize worksites for detailed analysis based on the passive and active surveillance information. The prioritization may be based on incidence rates, the number of workers affected, direct costs, lost work time, or severity of cases. Calculate incidence, prevalence, and severity rates by unit, work section, or job series to identify high-risk areas. Use FECA claims information to identify high-cost injuries and high-risk work areas.

3-3. Detailed analysis

a. To further evaluate those jobs or worksites having WMSD risk factors as determined by systematic passive and active surveillance, complete a more detailed analysis. When conducting the detailed analysis, trained ergonomics personnel should systematically–

- (1) Consider the concept of multiple causation (see glossary) and the degree of WMSD risk.
- (2) Look for trends, including age, gender, work task, and time of injury.
- (3) Identify the work tasks or portions of the process that contain risk factors.
- (4) Identify both problems and solutions.

b. The following data, analysis tools, and methods may be helpful during a detailed analysis:

- (1) Incidence and severity rates (Log of Federal Occupational Injuries and Illnesses or equivalent), accident and injury reports, and lost work time or absenteeism reports by job, unit, department, or facility.
- (2) Checklists, questionnaires, and interviews (USACHPPM TG 220).
- (3) Direct observation, videotape analysis, and job analyses (USACHPPM TG 220).
- (4) Assessment methodologies, such as–
 - (a) National Institute for Occupational Safety and Health (NIOSH) Publication 94-110.
 - (b) Static and dynamic strength testing.
 - (c) Timed activity analysis.
 - (d) Biomechanical analysis.
 - (e) Cardiovascular measurements.

Chapter 4 Hazard Prevention and Control

4-1. Intervention hierarchy

The primary method of preventing and controlling exposure to WMSD hazards is through effective design (or redesign) of a job or worksite. Paragraphs 4-2 through 4-7 define intervention methods in order of priority.

4-2. Process elimination

Elimination of the demanding process essentially eradicates the WMSD hazard. For example, eliminate the use of the hand-held bar code scanner for logistics/inventory management personnel by providing an automatic bar code scanner.

4-3. Engineering controls

Ergonomic engineering controls redesign the equipment or worksite to fit the limitations and capabilities of workers. Equipment or worksite redesign typically offers a permanent solution. For example, provide a video display terminal workstation that can be adjusted to a wide range of anthropometric dimensions.

4-4. Substitution

Substituting a new work process or tool (without WMSD hazards) for a work process with identified WMSD hazards can effectively eliminate the hazard. For example, replace hand tools that require awkward wrist positions (extreme wrist flexion, extension, or deviation) with tools that allow a neutral wrist posture.

4-5. Work practices

Practices that decrease worker exposure to WMSD risk factors include changing work techniques, providing personnel

conditioning programs, and regularly monitoring work practices. Also included are maintenance, adjustment, and modification of equipment and tools as needed.

a. Proper work techniques include methods that encourage–

- (1) Correct posture.
- (2) Use of proper body mechanics.
- (3) Appropriate use and maintenance of hand and power tools.
- (4) Correct use of equipment and workstations.

b. Personnel conditioning refers to the use of a conditioning or break-in period. New and returning personnel may need gradual integration into a full workload, depending on the job and the person. Supervisors, trained ergonomics personnel, and health care personnel should identify those jobs that require a break-in period. Health care personnel should evaluate those personnel returning from a health-related absence and define the break-in period for each individual person.

c. Regular monitoring of operations helps to ensure proper work practices and to confirm that the work practices do not contribute to WMSD or hazardous risk factors.

d. Effective schedules for facility, equipment, and tool maintenance, adjustments, and modifications will reduce WMSD hazards. This includes ensuring proper working conditions, having sufficient replacement tools to facilitate maintenance, and ensuring effective housekeeping programs. Tool and equipment maintenance may also include vibration monitoring.

4–6. Administrative controls

Use administrative controls to limit the duration, frequency, and severity of exposure to WMSD hazards. Examples of administrative controls include, but are not limited to–

a. Decreasing production rate requirements and limiting overtime work to reduce the number of repetitions.

b. Reducing the number and speed of repetitions by reducing line or production speed or by having worker input regarding production speed (that is, using worker-based rather than machine-based production speed).

c. Providing rest breaks to relieve fatigued muscle–tendon groups. Determine the length of the rest break by the effort required, total cycle time, and the muscle–tendon group involved.

d. Increasing the number of personnel assigned to the task (for example, lifting in teams rather than individually).

e. Instituting job rotation as a preventive measure, with the goal of alleviating physical fatigue and stress to a particular set of muscles and tendons. Do not use job rotation in response to symptoms of WMSD. This can contribute to symptom development in all personnel involved in the rotation schedule rather than preventing problems. Trained ergonomics and health care personnel should conduct an analysis of the jobs used in the rotation schedule.

f. Providing modified– or restricted–duty assignments to allow injured muscle–tendon groups time to rest, assisting in the healing process. Make every effort to provide modified– or restricted–duty assignments when physical limitations (as identified by a health care provider) allow the worker to return to work performing less than his or her normal work requirements. In regard to modified– or restricted–duty assignments:

(1) A health care provider should specifically identify assignments or job tasks for the individual worker based on his or her symptoms, capabilities, and limitations.

(2) Health care providers with specific knowledge in both occupational demands and cumulative trauma injuries should cooperate with trained ergonomics personnel to develop a list of jobs with low WMSD risk.

(3) Civilian personnel representatives and supervisors, in conjunction with health care personnel, should identify modified–duty assignments and tasks and write descriptions for these assignments and tasks that conform to documented requirements. A combination of tasks from one or more jobs can be used as a modified–duty assignment. *The description for each modified–duty assignment should include WMSD risk factors and muscle–tendon groups required to perform the job.*

4–7. Personal protective equipment

Personal protective equipment (PPE) is not necessarily recommended for controlling exposure to WMSD hazards, since little research has been conducted to support claims of its usefulness.

a. *Appliances, such as wrist rests, back belts, back braces, etc., are not considered PPE.* Before purchasing such devices, discuss their effectiveness with trained ergonomics personnel. The DOD does not support the blanket use of back belts as a back injury preventive measure. Antivibration gloves are an example of PPE that addresses WMSD hazards.

b. Consider WMSD hazards when selecting PPE. The PPE–

- (1) Should be properly worn or used according to Army and manufacturers' specifications.
- (2) Should be available in a variety of sizes.
- (3) Should accommodate the physical requirements of personnel and the job.

- (4) Should *not* contribute to WMSD hazards.

Chapter 5

Health Care Management

5–1. Written protocol

Health care personnel should develop a written protocol for the early recognition, evaluation, treatment, and follow-up of WMSDs. This chapter provides the structure and much of the content of the protocol. The protocol includes communication with supervisors and military and civilian personnel to identify worksite problems and implement recommendations. Health care personnel should tailor the protocol to their specific installation and provide it to the Ergonomics Subcommittee for review.

5–2. Early evaluation of patients

Early recognition and health care management of WMSDs are critical to reduce the impact of injury on both personnel and employer.

a. Common symptoms of WMSDs can include (but are not limited to) pain, tingling, numbness, stiffness, and weakness in the neck, shoulders, arms, hands, back, and legs. Other symptoms can include headaches, visual fatigue, and increased errors.

b. Soldiers and civilian personnel with symptoms of WMSDs should report to health care personnel for an evaluation.

(1) Active-duty soldiers should report to their primary care provider.

(2) Civilian personnel should report to occupational health with the appropriate forms: Department of Labor (DOL) Form CA–2 (Notice of Occupational Disease and Claim for Compensation) for all WMSDs except back injuries which require DOL Form CA–1 (Federal Employee’s Notice of Traumatic Injury and Claim for Continuation of Pay/Compensation) and DOL Form CA–16 (Authorization for Examination And/Or Treatment).

c. Supervisors should ensure that soldiers with WMSD symptoms report for a medical evaluation in a timely manner. Supervisors should encourage civilian personnel to report for a medical evaluation.

d. Supervisors may not place disincentives as an impediment to personnel reporting WMSDs.

5–3. Medical evaluation

The initial medical evaluation of a patient with a possible WMSD should include a detailed medical and occupational history and a physical examination. A standardized questionnaire is a useful tool for obtaining the history (USACHPPM TG 220). Health care personnel, within their approved scope of practice, should –

a. Complete a medical and occupational history that includes–

- (1) Military occupational specialty, job title or series, and number of years and months at that job.
- (2) Prior work history.
- (3) A detailed description of current job tasks and the amount of time normally spent on each task.
- (4) A detailed description of symptoms to include location, character (such as burning, sharp, dull, pins, and needles), severity, onset, duration, and exacerbating and relieving factors.

(5) Lost time or limited duty due to symptoms.

(6) Prior evaluation, diagnosis, and treatment of symptoms.

(7) Other existing medical conditions and history of trauma and surgery.

(8) Activities and hobbies outside of work.

(9) Current medications.

b. Conduct a physical examination that includes, but is not limited to–

- (1) Appearance (swelling, muscle atrophy, erythema, ecchymosis).
- (2) Range of motion and muscle strength.
- (3) Neurologic assessment (motor, sensory, reflexes).
- (4) Vascular assessment (pulses, capillary refill).
- (5) Evaluation for pain and tenderness.
- (6) Special tests, such as median nerve percussion (Tinel’s sign) and the wrist flexion test (Phalen’s test) when appropriate.

c. Perform additional testing as indicated, such as nerve conduction velocities, laboratory tests, and radiographic procedures.

5-4. Treatment

Health care personnel should initiate appropriate treatment and rehabilitation as defined by current standards of medical practice. In general, try conservative therapy before invasive treatment.

a. Supervisors, human resources personnel, and coworkers will encourage civilian personnel with a suspected WMSD to seek evaluation and treatment in an Army medical treatment facility (MTF) where possible, according to AR 690-800, chapter 810, subchapter 6. Priorities for care and authorization for treatment will be according to AR 40-5, paragraph 5-10a, and AR 40-400, paragraphs 2-3 and 3-15. Occupational health personnel will coordinate with human resources personnel and Patient Administration Division when there are questions about a person's entitlement to care.

b. Active-duty soldiers with a suspected WMSD will be seen in an Army MTF.

c. Army Reserve Component soldiers with a suspected Army-duty WMSD will be seen at an Army MTF according to AR 40-400, paragraph 3-2.

5-5. Modified or restricted duty

Health care personnel should coordinate with trained ergonomics personnel to recommend duty assignments that will not aggravate a patient's condition, as discussed in paragraph 4-6f.

5-6. Follow-up

Health care personnel should perform regular follow-up for patients being treated for WMSDs to monitor the efficacy of therapy and worksite intervention.

5-7. Medical surveillance

a. Work-related musculoskeletal disorders do not require a general screening medical surveillance program. Instead, use the methods of problem identification as described in chapter 3. Health care personnel, in cooperation with members of the Ergonomics Subcommittee, should-

(1) Conduct periodic, systematic worksite walk-through surveys to remain knowledgeable about operations and work practices. A minimum of once a year is suggested.

(2) Provide written documentation of the walk-through survey. Documentation should include date, area(s) visited, risk factors identified, actions taken (if any), and any needed prioritized follow-up.

b. Special medical surveillance may be indicated for-

(1) Specific jobs where a high incidence of WMSDs has been demonstrated.

(2) Specific jobs that have been identified as high risk based on systematic active surveillance and detailed analysis as discussed in chapter 3.

c. Maintain baseline and periodic health assessment results in personnel medical records. Pay attention to any changes that could indicate a WMSD.

5-8. Reporting

Occupational health, safety, and health care personnel should use the following forms to document WMSDs and perform passive surveillance. These findings should be reported to the Ergonomics Subcommittee.

a. Log of Federal Occupational Injuries and Illnesses or equivalent.

b. DOL Form CA-2 (all WMSDs except back injuries).

c. DOL Forms CA-1, CA-16, and CA-17 (Duty Status Report) (back injuries).

d. Standard Form (SF) 600 (Chronological Record of Medical Care) in the medical record.

e. DA Form 3075 (Occupational Health Daily Log).

f. DA Form 285 and DA Form 285-AB-R for reporting military occupational illnesses according to AR 385-40, paragraph 2-8.

5-9. Worksite evaluation referrals

a. Health care personnel who are treating a patient with a suspected WMSD should request a worksite evaluation for the patient through the IEO and the Ergonomics Subcommittee. Trained ergonomics personnel, together with health care personnel, should conduct the worksite evaluation.

b. Flow diagrams depicting the handling of traumatic injury and occupational disease and illness are available (USACHPPM TG 220).

Chapter 6

Education and Training

6-1. The "train the trainer" concept

Administer training programs in a pyramid fashion.

- a. Ergonomics experts provide training to develop trained ergonomics personnel.
- b. Trained ergonomics personnel–
 - (1) Then train others at the installation level, including supervisors and workers.
 - (2) May also train special assistants, who can help with recognizing WMSDs. The special assistants may be representatives from each department or division who assist other department members in recognizing and reporting WMSDs.

6–2. Education requirements

- a. The IEO should have–
 - (1) A minimum of 40 hours of formal ergonomics training. Formal training is classroom instruction, exercises, supervised worksite assessment, and individual learning assignments.
 - (2) Training and experience sufficient to identify WMSDs and risk factors.
- b. Trained ergonomics personnel should have–
 - (1) A minimum of 40 hours of formal ergonomics training.
 - (2) Training and experience sufficient to identify WMSDs and risk factors.
- c. Core Ergonomics Subcommittee members, support and advisory Ergonomics Subcommittee members, and installation-level personnel providing assistance in recognizing WMSDs should have basic ergonomics training, to include elements listed in paragraph 6–3c(2), from trained ergonomics personnel.
- d. For information on available in–depth courses, request assistance through command channels to the Commander, USACHPPM, ATTN: MCHB–TS–OER, Aberdeen Proving Ground, MD 21010–5403. The U.S. Army Safety Center (USASC) also offers information and training. To request assistance from USASC, contact Commander, USASC, ATTN: CSSC–P, Building 4905, 2901 5th Avenue, Fort Rucker, AL 36362–5363.

6–3. Training requirements

Personnel responsible for administering the installation Ergonomics Program should receive appropriate special training. Training is necessary for the Active Army, the U.S. Army Reserve, and the Army National Guard personnel and all levels of civilian personnel to enable them to understand and recognize potential WMSDs and actively participate in the ergonomics effort (USACHPPM TG 220).

- a. *Personnel requiring training.*
 - (1) All DA personnel who are potentially exposed to WMSDs.
 - (2) Supervisors.
 - (3) Managers.
 - (4) Engineers and maintenance personnel.
 - (5) Installation safety and occupational health personnel.
- b. *Personnel who may conduct training.*
 - (1) Trained ergonomics personnel.
 - (2) Suitable health care personnel to conduct specific portions of training, such as those related to health risks.
- c. *Curriculum considerations.* Trained ergonomics personnel should–
 - (1) Present training at a level appropriate to ensure audience comprehension.
 - (2) Include in the training curriculum an overview of–
 - (a) The potential risk of WMSDs.
 - (b) The possible causes and symptoms.
 - (c) How to recognize and report symptoms.
 - (d) The means of prevention.
 - (e) The sources of treatment.
 - (3) Include methods for evaluating the effectiveness of the ergonomics effort, as discussed in chapter 7.
- d. *Types of training.*
 - (1) *General training.* Personnel who are potentially exposed to WMSDs should receive formal instruction on hazards associated with their jobs and equipment. Personnel should receive training at an initial orientation and annually thereafter. This training should include elements listed in paragraph 6–3c(2).
 - (2) *Specific training.* New and reassigned military and civilian personnel who are potentially exposed to WMSDs should receive an initial orientation and hands–on training from trained ergonomics personnel and the immediate supervisor prior to being placed in a full–production position. The initial orientation should include–
 - (a) A demonstration of the proper use and care of, and the proper operating procedures for, all tools and equipment.
 - (b) Use of safety equipment.

- (c) Use of safe and proper work procedures, such as proper lifting techniques.

Chapter 7

Ergonomics Program Evaluation

7-1. Evaluation requirements

Both external and internal sources should evaluate each installation's Ergonomics Program to assess program effectiveness.

7-2. External evaluations

a. Authorized Occupational Safety and Health Administration (OSHA) inspections may result in citations to the activity commander for ergonomic deficiencies identified in the workplace.

b. Ergonomics Program personnel at USACHPPM, on request from the installation, can—

- (1) Assist with Ergonomics Program development.
- (2) Evaluate elements of the Ergonomics Program.
- (3) Conduct installation ergonomics surveys.

c. Each installation should continue to use existing reporting guidelines in AR 385-40, paragraph 2-6.

7-3. Internal evaluations

The IEO ensures evaluation of the ergonomics effort regarding program participation and effectiveness. Methods of measuring both of these elements are listed below. (See USACHPPM TG 220 for detailed information and examples of metrics for program evaluation.)

a. *Program participation.*

- (1) Number of requests for ergonomic assistance by management occurring during a specified period.
- (2) Number of personnel suggestions related to ergonomics during a specified period.
- (3) Number of educational programs in ergonomics offered or number of personnel attending educational programs.

b. *Program effectiveness.*

- (1) Number of general or systematic identifications of potential WMSDs.
- (2) Number of detailed analyses conducted (para 3-3).
- (3) Number of high priority listings relating to ergonomics.
- (4) Changes in the incidence and severity rates of WMSD illness or injury reports filed for military and civilian personnel.
- (5) Changes in the incidence and severity rates (see glossary) of WMSD FECA claims or dollar amount of new FECA claims within a particular period.
- (6) Changes in the incidence and severity rates of WMSD illness or injury by department or unit.
- (7) Changes in the incidence and severity rates of lost- or restricted-duty time due to WMSD illness or injury.
- (8) Changes in the number of new job reassignments due to WMSD illness or injury.
- (9) Changes in productivity or production costs that can be attributed to ergonomic interventions. Note: In some cases, there may be an increase in illness or injury reporting at the start of an Ergonomics Program due to increased personnel and supervisor awareness. Although reporting may increase, the severity rate (lost work time) should decrease, with more workers returning to work sooner. Eventually, the reporting rate will decrease as a well-managed, effective Ergonomics Program is integrated into the workplace.

7-4. Regular evaluation and review

a. The IEO and the Ergonomics Subcommittee—

- (1) Conduct at least a semiannual program evaluation and review.
- (2) Present the results of this program evaluation and review to the installation SOHAC.
- (3) Communicate the results of the program evaluation and review to top management and all workplace personnel.

b. The program evaluation assesses the implementation, progress, and effectiveness of the installation ergonomics plan. It should include—

- (1) A progress summary or program update.
- (2) A summary of results of external evaluations as defined in paragraph 7-2 and program participation and effectiveness measures as defined in paragraph 7-3.
- (3) Plans, goals, and accomplishments for the program as a whole and for each of the critical program elements cited in paragraph 2-4a(3).
- (4) Identification of trends, deficiencies, and corrective actions needed.
- (5) New or revised program goals, priorities, and time lines.

- c. Use the following information to develop the evaluation and review.
- (1) Analysis of trends in injury or illness rates according to—
 - (a) Health care facility sign-in logs.
 - (b) Log of Federal Occupational Injuries and Illnesses or an equivalent log.
 - (c) Individual personnel medical records.
 - (d) The Defense Occupational and Environmental Health Readiness System (DOEHRS) (for example, the DOEHRS IH Application).
 - (2) Review of results of installation evaluations.
 - (3) Before and after surveys or evaluations of worksite improvements.
 - (4) Observation of work practices to determine the effect of training and education.
 - (5) Personnel surveys or interviews conducted by department, job title, or work area to monitor trends.

Appendix A References

Section I Required Publications

AR 40-5

Preventive Medicine. (Cited in paras 1-1 and 5-4a.)

AR 40-400

Patient Administration. (Cited in paras 5-4a and 5-4c.)

AR 385-10

The Army Safety Program. (Cited in para 1-1.)

AR 385-40

Accident Reporting and Records. (Cited in paras 5-8f and 7-2c.)

AR 690-800

Insurance and Annuities. (Cited in para 5-4a.)

HQDA LTR 40-00-1

Headquarters Department of the Army Letter 40-00-1, DASG, 14 July 2000, subject: Army Ergonomics Program (Expires 14 July 2002). (Cited in paras 1-1 and 1-4b(3).)

Section II Related Publications

A related publication is merely a source of additional information. The user does not have to read it to understand this publication.

ANSI Z365 (Draft)

American National Standards Institute. (1998). Control of Work-Related Cumulative Trauma Disorders, Part 1: Upper Extremities. National Safety Council (NSC), Itasca, IL. (Available at cost from NSC, 1121 Spring Lake Drive, Itasca, IL 60143-3201; or contact ANSI, 11 West 42nd Street, New York, NY 10036.)

AR 40-10

Health Hazard Assessment Program in Support of the Army Materiel Acquisition Decision Process ftp://pubs.army.mil/pub/epubs/pdf/r40_10.pdf

AR 602-2

Manpower and Personnel Integration (MANPRINT) in the System Acquisition Process ftp://pubs.army.mil/pub/epubs/pdf/r602_2.pdf

29 CFR 1960.8

Agency responsibilities. (Available from the Superintendent of Documents, Government Printing Office, Washington, DC 20402.) <http://www.access.gpo.gov/nara/cfr/index.html>

DODI 6055.1

DOD Safety and Occupational Health (SOH) Program <http://web7.whs.osd.mil/pdf/i60551p.pdf>

EO 12196

Occupational Safety and Health Programs for Federal Employees

NIOSH Publication 94-110

Applications Manual for the Revised NIOSH Lifting Equation, U.S. Department of Health and Human Services (DHHS), NIOSH. 1994. (Available from NIOSH Publications, 4676 Columbia Parkway, Mail Stop C-13, Cincinnati, OH 45226-1998.) <http://www.nara.gov/fedreg/eo1980.html>

OSHA Publication 3123

Ergonomics Program Management Guidelines for Meatpacking Plants, U.S. Department of Labor, OSHA. 1991. (Available from U.S. Department of Labor, OSHA, 200 Constitution Ave., N.W., N3651, Washington, DC 20210.) <http://www.ergoweb.com/Pub/Info/Std/mpgindex.html>

PL 91-596

Occupational Safety and Health Act of 1970, as amended (29 USC 651 et seq.) <http://www.dol.gov/dol/asp/public/programs/handbook/osha.htm>

TB MED 503

The Army Industrial Hygiene Program <http://chppm-www/imo/ddb/dmd/DMD/TBMEDS/tb503.pdf>

Unnumbered publication

Chapanis, A., 1991. To Communicate the Human Factors Message, You Have to Know What the Message Is and How to Communicate It. Human Factors Society Bulletin, Vol 34 (11): 1-4. (Available from Human Factors and Ergonomics Society, P.O. Box 1369, Santa Monica, CA 90406-1369.)

Unnumbered publication

Directorate of Civilian Personnel and Installation Safety. 1992. A Supervisor's Guide to the Civilian Resource Conservation Program. (Available from the Directorate of Civilian Personnel and Installation Safety, U.S. Army Forces Command, 1777 Hardee Avenue, Fort McPherson, GA 30330-6000.)

Unnumbered publication

Memorandum, Office of the Assistant Secretary Installations Logistics and Environment, 18 May 1998, subject: Policy Memorandum – Army Ergonomics Program. (Available from U.S. Army Center for Health Promotion and Preventive Medicine, ATTN: MCHB-CS-IDM, 5158 Blackhawk Road, Aberdeen Proving Ground, MD 21010-5403.) http://chppm-www.apgea.army.mil/ergopgm/policy/FATZ_6.DOC

Unnumbered publication

Memorandum, Office of the Under Secretary of Defense (Environmental Security), Acquisition and Technology, 4 February 1997, subject: Ergonomics Program Requirements. (Available from U.S. Army Center for Health Promotion and Preventive Medicine, ATTN: MCHB-CS-IDM, 5158 Blackhawk Road, Aberdeen Proving Ground, MD 21010-5403.) http://chppm-www.apgea.army.mil/ergopgm/policy/GOOD_6.DOC

USACHPPM TG 220 (Draft)

Ergonomics in Action. U.S. Army Center for Health Promotion and Preventive Medicine and the U.S. Army Safety Center. (Available from U.S. Army Center for Health Promotion and Preventive Medicine, ATTN: MCHB-CS-IDM, 5158 Blackhawk Road, Aberdeen Proving Ground, MD 21010-5403.)

Section III**Prescribed Forms**

This section contains no entries.

Section IV**Referenced Forms****DA Form 285**

U.S. Army Accident Report

DA Form 285-AB-R

U.S. Army Abbreviated Ground Accident Report (AGAR)

DA Form 3075

Occupational Health Daily Log

DA Form 3076

Army Occupational Health Report

DOL Form CA-1

Federal Employee's Notice of Traumatic Injury and Claim for Continuation of Pay/Compensation

DOL Form CA-2

Notice of Occupational Disease and Claim for Compensation

DOL Form CA-16

Authorization for Examination And/Or Treatment

DOL Form CA-17

Duty Status Report

SF 600

Health Record—Chronological Record of Medical Care

Unnumbered Form

Log of Federal Occupational Injuries and Illnesses

* DA forms and SF 600 are available through local publications. Log of Federal Occupational Injuries and Illnesses and DOL forms are available from the U.S. Department of Labor, OSHA, 200 Constitution Ave., N.W., Washington, DC 20210.

Appendix B**Recommended Membership of the Ergonomics Subcommittee****B-1. Chairperson**

The IEO—

- a. Serves as chairperson of the Ergonomics Subcommittee.
- b. Should be the chief, PVNTMED, who will receive at least 40 hours of formal training in ergonomics (para 6-2a). (If an occupational health physician, flight surgeon, industrial hygienist, occupational health nurse, other health care professional, or safety manager who has received at least 40 hours of formal training in ergonomics is more qualified, that person may serve as IEO. If there is no chief, PVNTMED, another qualified health or safety professional may serve.)

B-2. Membership

The Ergonomics Subcommittee should include, but need not be limited to, the following representatives:

- a. *Core membership.*
 - (1) Health care activity representative (for example, physician, nurse, occupational and physical therapists, physician assistant, and other trained medical personnel).
 - (2) Industrial hygienist.
 - (3) Safety professional.
 - (4) Tenant activity representative.
 - (5) Union representative(s).
 - (6) Human resources representative.
- b. *Support and advisory membership.*
 - (1) Director of Contracting Support (or equivalent) representative.
 - (2) Director of Public Works representative.
 - (3) Director of Logistics representative.
 - (4) Engineering and maintenance personnel representative.

B-3. Training

All subcommittee members should receive appropriate ergonomics training as discussed in chapter 6.

Glossary

Section I Abbreviations

AGAR

Abbreviated Ground Accident Report

ANSI

American National Standards Institute

AR

Army Regulation

ARNG

Army National Guard

CFR

Code of Federal Regulations

CTD

cumulative trauma disorder

DA

Department of the Army

DHHS

Department of Health and Human Services

DOD

Department of Defense

DODI

Department of Defense Instruction

DOEHRS

Defense Occupational and Environmental Health Readiness System

DOL

Department of Labor

EO

Executive Order

FECA

Federal Employee Compensation Act

HQDA

Headquarters, Department of the Army

HQDA LTR

Headquarters, Department of the Army Letter

IEO

Installation Ergonomics Officer

IH

industrial hygiene

MANPRINT

Manpower and Personnel Integration

MTF

medical treatment facility

NIOSH

National Institute for Occupational Safety and Health

NSC

National Safety Council

OSHA

Occupational Safety and Health Administration

PL

Public Law

PPE

personal protective equipment

PVNTMED

preventive medicine

SF

Standard Form

SOH

safety and occupational health

SOHAC

Safety and Occupational Health Advisory Council

TG

Technical Guide

USACHPPM

U.S. Army Center for Health Promotion and Preventive Medicine

USAR

U.S. Army Reserve

USASC

U.S. Army Safety Center

USC

United States Code

WMSD

work-related musculoskeletal disorder(s)

Section II**Terms****Anthropometry**

The study of the physical dimensions of people, including size, breadth, girth, distance between anatomical points, and joint range of motion. This information is used in the design and analysis of workspaces, tools, and equipment.

Cumulative trauma disorders (CTDs)

Disorders of the musculoskeletal or nervous system that are the result of, or contributed to by, the biomechanical risk factors listed in paragraph 1–9. CTDs are a class of musculoskeletal disorders involving damage to the tendons, tendon sheaths, synovial lubrication of the tendon sheaths, and the related bones, muscles, and nerves. Synonymous terms include WMSD, repetitive motion injury, occupational overuse syndrome, and repetitive strain injury.

Equivalent civilian training

A minimum of 40 hours training covering WMSDs; workstation and job design; hand tool design; current regulatory requirements and issues; analysis and design of manual materials handling tasks; analysis and design of the office environment; and conducting, analyzing, documenting, and presenting an ergonomic worksite evaluation, including hands-on experience.

Ergonomics

A body of knowledge about human abilities, human limitations, and other human characteristics that are relevant to the design of tools, machines, systems, tasks, jobs, and environments for safe, comfortable, and effective human use. The aim of the discipline is to fit the job to the person in order to–

- a. Prevent the development of occupational injury or illness.
- b. Reduce the potential for fatigue, error, or unsafe acts.
- c. Increase effective, efficient work.

Ergonomics expert

An individual who–

- a. Possesses a recognized degree or professional credentials in ergonomics or human factors engineering (typically a master's or doctorate degree).
- b. Demonstrates the ability to identify and correct WMSDs in the workplace.
- c. Teaches the 40-hour ergonomics course for trained ergonomics personnel.
- d. Provides consultation only in cases in which trained ergonomics personnel are unable to solve identified problems. In most cases, an ergonomics expert will not be available at each installation.

Ergonomics team

Those responsible for identifying and correcting occupational hazards in the workplace, including trained ergonomics personnel, health care providers, industrial hygienists, safety personnel, engineers, and other support personnel, managers, and supervisors.

Health care personnel

Physicians, chiropractic physicians, nurses, occupational therapists, physical therapists, physician assistants, and other health care professionals and their related, supervised technicians (for example, certified occupational therapy assistants and licensed practical nurses). Health care personnel participating in the Ergonomics Program should have training in basic ergonomics and epidemiology and be up-to-date in the systematic recognition, evaluation, treatment, and rehabilitation of WMSDs.

Microtrauma

A series of minor stresses to the body, each of which alone does not cause discernible damage; however, their accumulation over time can lead to WMSDs. These disorders (injuries or syndromes) are also known as CTDs, overuse disorders, repetitive motion injuries, repetitive strain injuries, and occupational motion-related injuries.

Multiple causation

The combined effect of several risk factors in one job, operation, or workstation, that may increase the possibility of WMSDs.

Occupational hazards

Workplace conditions that may harm the worker: improperly designed workstations; tools and equipment; improper work methods; and excessive tool or equipment vibration. Other examples include aspects of work flow, line speed, posture, force required, work and rest regimens, and repetition rates.

Occupational illness and injury

a. To be recorded as an occupational illness or injury, the condition must be diagnosed by a physician, registered nurse, or other person who, by training or experience, is capable of making such a determination (such as an occupational therapist, physical therapist, or physician assistant).

b. To be classified as an occupational illness or injury, the condition must meet the following criteria:

(1) Either physical findings or subjective symptoms must exist, that is, at least one physical finding (for example, positive Tinel's, Phalen's, or Finkelstein's test; swelling, redness, or deformity; or loss of motion or strength) or at least one subjective symptom (for example, pain, numbness, tingling, aching, stiffness, or burning).

(2) At least one of the following response actions must occur: medical treatment (including self-administered

treatment if made available to personnel by their employer), lost or restricted work activity, or transfer or rotation to another job.

(3) WMSDs must be associated with repeated trauma, and exposure at work must have caused or contributed to the onset of symptoms or aggravated existing symptoms.

Pinch grip

A grip that involves one or more fingers and the thumb.

Rate (incidence, severity, prevalence)

a. Incidence (new case) rate (per 100 worker-years per year):

$$\frac{\text{Number of new cases during the past 12 months} \times 200,000 \text{ hours}}{\text{Number of work hours during the past 12 months}}$$

b. Severity (lost workdays) rate (per 100 worker-years per year):

$$\frac{\text{Number of lost workdays during the past 12 months} \times 200,000 \text{ hours}}{\text{Number of work hours during the past 12 months}}$$

c. Prevalence (all cases during period) rate (per 100 worker-years per year):

$$\frac{\text{Total number of cases in the past 12 months} \times 200,000 \text{ hours}}{\text{Number of work hours during the past 12 months}}$$

d. Calculating rates:

(1) Use incidence rates, if possible, since the incidence rate measures new cases occurring over a period of time, while prevalence rates give a “snapshot” picture of the number of individuals affected at a specific point in time. Incidence rate and severity rate allow monitoring of changes over time, rather than recounting chronic problems throughout the duration of the illness or injury.

(2) Consistency in reporting is important; therefore, one should use either incidence, severity or prevalence rates for purposes of comparison.

(3) If the specific number of work hours during the past 12 months is not available, multiply the number of full-time equivalent employees in each area by 2,000 hours to obtain the denominator.

Trained ergonomics personnel

Health care, industrial hygiene, environmental science, safety, or engineering personnel with approved training in ergonomics. Minimum acceptable training for installation-level trained ergonomics personnel is the basic 40-hour ergonomics course offered by USACHPPM or equivalent civilian training.

Working community

All members of the work environment, at all levels of authority. It consists of major command commanders, installation commanders, the Installation Medical Authority, the designated IEO, identified ergonomics personnel, health care personnel, safety personnel, human resources personnel, contracting support personnel, public works personnel, logistics personnel, union representatives, tenant activities representatives, unit commanders, supervisors, and active-duty military and civilian personnel. For the program to be successful, all members of the working community must be considered equal and must share the commitment to ergonomics.

Work-related musculoskeletal disorders

a. The range of health problems arising from repeated stress to the body encountered in the workplace. These health problems may also affect the nervous and neurovascular systems and may include the various occupationally induced cumulative trauma injuries, and repetitive motion disorders.

b. Damage to tendons, tendon sheaths, synovial lubrication of the tendon sheaths, bones, muscles, and nerves of the hands, wrists, elbows, shoulders, neck, back, and legs. Some WMSDs that are reported include chronic back pain, carpal tunnel syndrome, DeQuervains disease, epicondylitis (tennis elbow), Raynaud’s syndrome (white finger), synovitis, tenosynovitis, stenosing tenosynovitis crepitans (trigger finger), and tendinitis.

Worksite

A work area or work environment.

Workstation

An individual person’s work area, such as a desk, chair, and computer terminal or an individual inspection station.

Section III

Special Abbreviations and Terms

This section contains no entries.

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